

SEQUENCE LISTING

<110> Steward, Lance E.
Fernandez-Salas, Ester
Aoki, Kei Roger

<120> Fret Protease Assays For Botulinum
Serotype A/E Toxins

<130> P-AR 4803

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<170> FastSEQ for Windows Version 4.0

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<212> PRT

<213> Artificial Sequence

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<213> Homo sapiens

<400> 2

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		20						25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met
		50				55					60				
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp
65				70					75					80	
Leu	Gly	Lys	Phe	Cys	Gly	Leu	Cys	Val	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85					90						95	
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val
			100				105						110		
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala
		115					120						125		

T03230"42024660

Ile Ser Gly Gly Phe Ile Arg Arg Val Thr Asn Asp Ala Arg Glu Asn
130 135 140
Glu Met Asp Glu Asn Leu Glu Gln Val Ser Gly Ile Ile Gly Asn Leu
145 150 155 160
Arg His Met Ala Leu Asp Met Gly Asn Glu Ile Asp Thr Gln Asn Arg
165 170 175
Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys Thr Arg Ile
180 185 190
Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser Gly
195 200 205

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Gly Ala Ser Gln Phe Glu Thr Ser
1 5

<210> 4
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<212> PRT
<213> Homo sapiens

<400> 4
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Gly Gly Pro Pro Ala Pro Pro Pro Asn Leu Thr Ser Asn Arg Arg Leu
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Gln Gln Thr Gln Ala Gln Val Asp Glu Val Val Asp Ile Met Arg Val
35 40 45
Asn Val Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp
50 55 60
Asp Arg Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Thr Ser
65 70 75 80
Ala Ala Lys Leu Lys Arg Lys Tyr Trp Trp Lys Asn Leu Lys Met Met
85 90 95
Ile Ile Leu Gly Val Ile Cys Ala Ile Ile Leu Ile Ile Ile Ile Val
100 105 110
Tyr Phe Ser Ser
115

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Arg	Ala	Asp	Gln	Leu	Ala	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
			20					25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met
	50					55					60				
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp
65				70						75				80	
Leu	Gly	Lys	Phe	Cys	Gly	Leu	Cys	Val	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85					90					95		
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val
			100					105					110		
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala
		115					120					125			
Ile	Ser	Gly	Gly	Phe	Ile	Arg	Arg	Val	Thr	Asn	Asp	Ala	Arg	Glu	Asn
	130					135					140				
Glu	Met	Asp	Glu	Asn	Leu	Glu	Gln	Val	Ser	Gly	Ile	Ile	Gly	Asn	Leu

145		150		155		160									
Arg	His	Met	Ala	Leu	Asp	Met	Gly	Asn	Glu	Ile	Asp	Thr	Gln	Asn	Arg
			165				170							175	
Gln	Ile	Asp	Arg	Ile	Met	Glu	Lys	Ala	Asp	Ser	Asn	Lys	Thr	Arg	Ile
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Asp	Glu	Ala	Asn	Gln	Arg	Ala	Thr	Lys	Met	Leu	Gly	Ser	Gly		
		195					200						205		

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<223> synthetic construct

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Gln Ile Asp Arg Ile Met Glu Lys
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<213> Artificial Sequence

<220>
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Glu Arg Asp Gln Lys Leu Ser Glu
1 5

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<213> Artificial Sequence

<220>
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Glu Thr Ser Ala Ala Lys Leu Lys
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<210> 13
<211> 212
<212> PRT
<213> Drosophila sp.
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<400> 13

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Glu	Leu	Glu	Glu	Leu	Gln	Ile	Asn	Ala	Gln	Gly	Val	Ala	Asp	Glu	Ser
			20					25					30		
Leu	Glu	Ser	Thr	Arg	Arg	Met	Leu	Ala	Leu	Cys	Glu	Glu	Ser	Lys	Glu
		35				40						45			
Ala	Gly	Ile	Arg	Thr	Leu	Val	Ala	Leu	Asp	Asp	Gln	Gly	Glu	Gln	Leu
	50					55					60				
Asp	Arg	Ile	Glu	Glu	Gly	Met	Asp	Gln	Ile	Asn	Ala	Asp	Met	Arg	Glu
65					70				75					80	
Ala	Glu	Lys	Asn	Leu	Ser	Gly	Met	Glu	Lys	Cys	Cys	Gly	Ile	Cys	Val
			85						90					95	
Leu	Pro	Cys	Asn	Lys	Ser	Gln	Ser	Phe	Lys	Glu	Asp	Asp	Gly	Thr	Trp
			100					105					110		
Lys	Gly	Asn	Asp	Asp	Gly	Lys	Val	Val	Asn	Asn	Gln	Pro	Gln	Arg	Val
		115					120						125		
Met	Asp	Asp	Arg	Asn	Gly	Met	Met	Ala	Gln	Ala	Gly	Tyr	Ile	Gly	Arg
	130					135					140				
Ile	Thr	Asn	Asp	Ala	Arg	Glu	Asp	Glu	Met	Glu	Glu	Asn	Met	Gly	Gln
145					150					155					160
Val	Asn	Thr	Met	Ile	Gly	Asn	Leu	Arg	Asn	Met	Ala	Leu	Asp	Met	Gly
				165					170					175	
Ser	Glu	Leu	Glu	Asn	Gln	Asn	Arg	Gln	Ile	Asp	Arg	Ile	Asn	Arg	Lys
			180					185					190		
Gly	Glu	Ser	Asn	Glu	Ala	Arg	Ile	Ala	Val	Ala	Asn	Gln	Arg	Ala	His
		195					200					205			
Gln	Leu	Leu	Lys												
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<210> 14

<211> 203

<212> PRT

<213> Carassius auratus

<400> 14

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Arg	Ala	Asp	Gln	Leu	Gly	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
			20					25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met
	50					55					60				
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp
65				70					75					80	
Leu	Gly	Asn	Leu	Cys	Gly	Leu	Cys	Pro	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85						90					95	
Gly	Gly	Gly	Gln	Ser	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val	Val	Ser	Ser
			100					105					110		
Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala	Ile	Ser	Gly
		115					120						125		

TC2230-TC2450

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<212> PRT
<213> Strongylocentrotus purpuratus
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<210> 16
<211> 249
<212> PRT
<213> Gallus gallus
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<400> 16

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Arg	Ala	Asp	Gln	Leu	Ala	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
			20					25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Asp	Arg	Val	Glu	Glu	Gly	Met
	50					55					60				
Asn	His	Ile	Asn	Gln	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Lys	Asp
65					70					75					80
Leu	Gly	Lys	Cys	Cys	Gly	Leu	Phe	Ile	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85						90					95	
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val
			100					105					110		
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala
		115					120						125		
Ile	Ser	Gly	Gly	Phe	Ile	Arg	Arg	Val	Thr	Asn	Asp	Ala	Arg	Glu	Asn
		130				135					140				
Glu	Met	Asp	Glu	Asn	Leu	Glu	Gln	Val	Ser	Gly	Ile	Ile	Gly	Asn	Leu
145					150					155					160
Arg	His	Met	Ala	Leu	Asp	Met	Gly	Asn	Glu	Ile	Asp	Thr	Gln	Asn	Arg
				165					170					175	
Gln	Ile	Asp	Arg	Ile	Met	Glu	Lys	Leu	Ile	Pro	Ile	Lys	Pro	Gly	Leu
			180					185					190		
Met	Lys	Pro	Thr	Ser	Val	Gln	Gln	Arg	Cys	Ser	Ala	Val	Val	Lys	Cys
		195					200					205			
Ser	Lys	Val	His	Phe	Leu	Leu	Met	Leu	Ser	Gln	Arg	Ala	Val	Pro	Ser
		210				215					220				
Cys	Phe	Tyr	His	Gly	Ile	Tyr	Leu	Leu	Gly	Leu	His	Thr	Cys	Thr	Tyr
225					230					235					240
Gln	Pro	His	Cys	Lys	Cys	Cys	Pro	Val							
				245											

<210> 17

<211> 116

<212> PRT

<213> Mus musculus

<400> 17

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Gly	Gly	Pro	Pro	Ala	Pro	Pro	Pro	Asn	Leu	Thr	Ser	Asn	Arg	Arg	Leu
			20					25					30		
Gln	Gln	Thr	Gln	Ala	Gln	Val	Asp	Glu	Val	Val	Asp	Ile	Met	Arg	Val
		35					40					45			
Asn	Val	Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp
	50					55					60				
Asp	Arg	Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser
65					70					75					80
Ala	Ala	Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp	Lys	Asn	Leu	Lys	Met	Met
				85					90					95	

09042024 09042024


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<210> 18
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<212> PRT
<213> Bos taurus
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<210> 19
<211> 114
<212> PRT
<213> Xenopus laevis
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<210> 20
 <211> 104
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 <213> Strongylocentrotus purpuratus

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 20 25 30
 Asn Val Asp Lys Val Leu Glu Arg Asp Gln Ala Leu Ser Val Leu Asp
 35 40 45
 Asp Arg Ala Asp Ala Leu Gln Gln Gly Ala Ser Gln Phe Glu Thr Asn
 50 55 60
 Ala Gly Lys Leu Lys Arg Lys Tyr Trp Trp Lys Asn Cys Lys Met Met
 65 70 75 80
 Ile Ile Leu Ala Ile Ile Ile Ile Val Ile Leu Ile Ile Ile Ile Val
 85 90 95
 Ala Ile Val Gln Ser Gln Lys Lys
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<210> 21
 <211> 288
 <212> PRT
 <213> Homo sapiens

<400> 21
 Met Lys Asp Arg Thr Gln Glu Leu Arg Thr Ala Lys Asp Ser Asp Asp
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 Asp Asp Asp Val Ala Val Thr Val Asp Arg Asp Arg Phe Met Asp Glu
 20 25 30
 Phe Phe Glu Gln Val Glu Glu Ile Arg Gly Phe Ile Asp Lys Ile Ala
 35 40 45
 Glu Asn Val Glu Glu Val Lys Arg Lys His Ser Ala Ile Leu Ala Ser
 50 55 60
 Pro Asn Pro Asp Glu Lys Thr Lys Glu Glu Leu Glu Glu Leu Met Ser
 65 70 75 80
 Asp Ile Lys Lys Thr Ala Asn Lys Val Arg Ser Lys Leu Lys Ser Ile
 85 90 95
 Glu Gln Ser Ile Glu Gln Glu Glu Gly Leu Asn Arg Ser Ser Ala Asp
 100 105 110
 Leu Arg Ile Arg Lys Thr Gln His Ser Thr Leu Ser Arg Lys Phe Val
 115 120 125
 Glu Val Met Ser Glu Tyr Asn Ala Thr Gln Ser Asp Tyr Arg Glu Arg
 130 135 140
 Cys Lys Gly Arg Ile Gln Arg Gln Leu Glu Ile Thr Gly Arg Thr Thr
 145 150 155 160
 Thr Ser Glu Glu Leu Glu Asp Met Leu Glu Ser Gly Asn Pro Ala Ile
 165 170 175
 Phe Ala Ser Gly Ile Ile Met Asp Ser Ser Ile Ser Lys Gln Ala Leu
 180 185 190

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<210> 22
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			20					25					30			
Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Cys	Ile	Glu	Lys	Leu	Ser	Glu	
		35					40					45				
Asp	Val	Glu	Gln	Val	Lys	Lys	Gln	His	Ser	Ala	Ile	Leu	Ala	Ala	Pro	
	50					55					60					
Asn	Pro	Asp	Glu	Lys	Thr	Lys	Gln	Glu	Leu	Glu	Asp	Leu	Thr	Ala	Asp	
65					70					75					80	
Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ser	Lys	Leu	Lys	Ala	Ile	Glu	
			85					90						95		
Gln	Ser	Ile	Glu	Gln	Glu	Glu	Gly	Leu	Asn	Arg	Ser	Ser	Ala	Asp	Leu	
			100					105					110			
Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg	Lys	Phe	Val	Glu	
		115					120					125				
Val	Met	Thr	Glu	Tyr	Asn	Ala	Thr	Gln	Ser	Lys	Tyr	Arg	Asp	Arg	Cys	
	130					135					140					
Lys	Asp	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly	Arg	Thr	Thr	Thr	
145					150					155					160	
Asn	Glu	Glu	Leu	Glu	Asp	Met	Leu	Glu	Ser	Gly	Lys	Leu	Ala	Ile	Phe	
			165					170						175		
Thr	Asp	Asp	Ile	Lys	Met	Asp	Ser	Gln	Met	Thr	Lys	Gln	Ala	Leu	Asn	
			180					185					190			
Glu	Ile	Glu	Thr	Arg	His	Asn	Glu	Ile	Ile	Lys	Leu	Glu	Thr	Ser	Ile	
		195					200				205					
Arg	Glu	Leu	His	Asp	Met	Phe	Val	Asp	Met	Ala	Met	Leu	Val	Glu	Ser	
	210					215					220					
Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	Asn	Val	Glu	His	Ser	Val	
225					230					235					240	
Asp	Tyr	Val	Glu	Arg	Ala	Val	Ser	Asp	Thr	Lys	Lys	Ala	Val	Lys	Tyr	
			245					250						255		
Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Ile	Met	Ile	Ile	Ile	Cys	Cys	Val	

	260		265		270
Val	Leu	Gly	Val	Val	Leu
		Ala	Ser	Ser	Ile
				Gly	Gly
					Thr
					Leu
					Gly
					Leu

<210> 23
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 <212> PRT
 <213> Mus musculus

<400> 23

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			20					25					30		
Phe	Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Phe	Ile	Asp	Lys	Ile	Ala
		35					40					45			
Glu	Asn	Val	Glu	Glu	Val	Lys	Arg	Lys	His	Ser	Ala	Ile	Leu	Ala	Ser
	50					55					60				
Pro	Asn	Pro	Asp	Glu	Lys	Thr	Lys	Glu	Glu	Leu	Glu	Glu	Leu	Met	Ser
65					70					75				80	
Asp	Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ser	Lys	Leu	Lys	Ser	Ile
				85					90					95	
Glu	Gln	Ser	Ile	Glu	Gln	Glu	Glu	Gly	Leu	Asn	Arg	Ser	Ser	Ala	Asp
			100					105					110		
Leu	Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg	Lys	Phe	Val
	115					120						125			
Glu	Val	Met	Ser	Glu	Tyr	Asn	Ala	Thr	Gln	Ser	Asp	Tyr	Arg	Glu	Arg
	130					135					140				
Cys	Lys	Gly	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly	Arg	Thr	Thr
145					150					155				160	
Thr	Ser	Glu	Glu	Leu	Glu	Asp	Met	Leu	Glu	Ser	Gly	Asn	Pro	Ala	Ile
				165					170					175	
Phe	Ala	Ser	Gly	Ile	Ile	Met	Asp	Ser	Ser	Ile	Ser	Lys	Gln	Ala	Leu
		180					185						190		
Ser	Glu	Ile	Glu	Thr	Arg	His	Ser	Glu	Ile	Ile	Lys	Leu	Glu	Thr	Ser
	195					200						205			
Ile	Arg	Glu	Leu	His	Asp	Met	Phe	Met	Asp	Met	Ala	Met	Leu	Val	Glu
	210				215						220				
Ser	Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	Asn	Val	Glu	His	Ala
225					230					235				240	
Val	Asp	Tyr	Val	Glu	Arg	Ala	Val	Ser	Asp	Thr	Lys	Lys	Ala	Val	Lys
				245					250					255	
Tyr	Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Ile	Met	Ile	Ile	Ile	Cys	Cys
		260					265						270		
Val	Ile	Leu	Gly	Ile	Ile	Ile	Ala	Ser	Thr	Ile	Gly	Gly	Ile	Phe	Gly
		275					280						285		

<210> 24
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 <212> PRT
 <213> Drosophila sp.

protein data bank

<400> 24

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Glu	Glu	Glu	Thr	Glu	Val	Ala	Val	Asn	Val	Asp	Gly	His	Asp	Ser	Tyr
			20					25					30		
Met	Asp	Asp	Phe	Phe	Ala	Gln	Val	Glu	Glu	Ile	Arg	Gly	Met	Ile	Asp
		35					40					45			
Lys	Val	Gln	Asp	Asn	Val	Glu	Glu	Val	Lys	Lys	Lys	His	Ser	Ala	Ile
	50					55					60				
Leu	Ser	Ala	Pro	Gln	Thr	Asp	Glu	Lys	Thr	Lys	Gln	Glu	Leu	Glu	Asp
65				70					75						80
Leu	Met	Ala	Asp	Ile	Lys	Lys	Asn	Ala	Asn	Arg	Val	Arg	Gly	Lys	Leu
				85					90					95	
Lys	Gly	Ile	Glu	Gln	Asn	Ile	Glu	Gln	Glu	Glu	Gln	Gln	Asn	Lys	Ser
			100					105					110		
Ser	Ala	Asp	Leu	Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg
		115					120					125			
Lys	Phe	Val	Glu	Val	Met	Thr	Glu	Tyr	Asn	Arg	Thr	Gln	Thr	Asp	Tyr
	130					135					140				
Arg	Glu	Arg	Cys	Lys	Gly	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly
145				150					155						160
Arg	Pro	Thr	Asn	Asp	Asp	Glu	Leu	Glu	Lys	Met	Leu	Glu	Glu	Gly	Asn
				165					170					175	
Ser	Ser	Val	Phe	Thr	Gln	Gly	Ile	Ile	Met	Glu	Thr	Gln	Gln	Ala	Lys
			180					185					190		
Gln	Thr	Leu	Ala	Asp	Ile	Glu	Ala	Arg	His	Gln	Asp	Ile	Met	Lys	Leu
	195						200					205			
Glu	Thr	Ser	Ile	Lys	Glu	Leu	His	Asp	Met	Phe	Met	Asp	Met	Ala	Met
	210					215					220				
Leu	Val	Glu	Ser	Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	His	Val
225				230					235						240
Glu	His	Ala	Met	Asp	Tyr	Val	Gln	Thr	Ala	Thr	Gln	Asp	Thr	Lys	Lys
				245					250					255	
Ala	Leu	Lys	Tyr	Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Ile	Met	Ile	Leu
			260					265					270		
Ile	Cys	Leu	Thr	Val	Leu	Gly	Ile	Leu	Ala	Ala	Ser	Tyr	Val	Ser	Ser
	275					280						285			
Tyr	Phe	Met													
	290														

<210> 25

<211> 291

<212> PRT

<213> Caenorhabditis elegans

<400> 25

Met	Thr	Lys	Asp	Arg	Leu	Ser	Ala	Leu	Lys	Ala	Ala	Gln	Ser	Glu	Asp
1				5					10					15	
Glu	Gln	Asp	Asp	Asp	Met	His	Met	Asp	Thr	Gly	Asn	Ala	Gln	Tyr	Met
		20						25					30		
Glu	Glu	Phe	Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Ser	Val	Asp	Ile

```
<210> 26
<211> 288
<212> PRT
<213> Strongylocentrotus purpuratus
```

Met	Arg	Asp	Arg	Leu	Gly	Ser	Leu	Lys	Arg	Asn	Glu	Glu	Asp	Asp	Val
1				5					10					15	
Gly	Pro	Glu	Val	Ala	Val	Asn	Val	Glu	Ser	Glu	Lys	Phe	Met	Glu	Glu
			20					25					30		
Phe	Phe	Glu	Gln	Val	Glu	Glu	Val	Arg	Asn	Asn	Ile	Asp	Lys	Ile	Ser
		35					40					45			
Lys	Asn	Val	Asp	Glu	Val	Lys	Lys	Lys	His	Ser	Asp	Ile	Leu	Ser	Ala
	50					55					60				
Pro	Gln	Ala	Asp	Glu	Lys	Val	Lys	Asp	Glu	Leu	Glu	Glu	Leu	Met	Ser
65					70					75					80
Asp	Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ala	Lys	Leu	Lys	Met	Met
				85					90					95	

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<210> 27
<211> 13
<212> PRT
<213> Homo sapiens
```

```
<210> 28
<211> 15
<212> PRT
<213> Homo sapiens
```

```
<210> 29
<211> 16
<212> PRT
<213> Homo sapiens
```

<400> 29
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met

1 5 10 15

<210> 30
<211> 17
<212> PRT
<213> Homo sapiens

<400> 30
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 31
<211> 17
<212> PRT
<213> Homo sapiens

<400> 31
Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
1 5 10 15
Met

<210> 32
<211> 18
<212> PRT
<213> Homo sapiens

<400> 32
Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
1 5 10 15
Met Leu

<210> 33
<211> 33
<212> PRT
<213> Mus musculus

<400> 33
Gln Asn Arg Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys
1 5 10 15
Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser
20 25 30
Gly

Truncated"42034650

<210> 34
<211> 32
<212> PRT
<213> Homo sapiens

<400> 34
Gln Asn Pro Gln Ile Lys Arg Ile Thr Asp Lys Ala Asp Thr Asn Arg
1 5 10 15
Asp Arg Ile Asp Ile Ala Asn Ala Arg Ala Lys Lys Leu Ile Asp Ser
20 25 30

<210> 35
<211> 32
<212> PRT
<213> Mus musculus

<400> 35
Gln Asn Gln Gln Ile Gln Lys Ile Thr Glu Lys Ala Asp Thr Asn Lys
1 5 10 15
Asn Arg Ile Asp Ile Ala Asn Thr Arg Ala Lys Lys Leu Ile Asp Ser
20 25 30

<210> 36
<211> 34
<212> PRT
<213> Gallus gallus

<400> 36
Gln Asn Arg Gln Ile Asp Arg Ile Met Glu Lys Leu Ile Pro Ile Lys
1 5 10 15
Pro Gly Leu Met Lys Pro Thr Ser Val Gln Gln Arg Cys Ser Ala Val
20 25 30
Val Lys

<210> 37
<211> 33
<212> PRT
<213> Carassius auratus

<400> 37
Gln Asn Arg Gln Ile Asp Arg Ile Met Asp Met Ala Asp Ser Asn Lys
1 5 10 15
Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser
20 25 30
Gly

<210> 38

Truncated at position 34

<211> 33
<212> PRT
<213> *Carassius auratus*

<400> 38
Gln Asn Arg Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys
1 5 10 15
Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser
20 25 30
Gly

<210> 39
<211> 30
<212> PRT
<213> *Torpedo sp.*

<400> 39
Gln Asn Ala Gln Val Asp Arg Ile Val Val Lys Gly Asp Met Asn Lys
1 5 10 15
Ala Arg Ile Asp Glu Ala Asn Lys His Ala Thr Lys Met Leu
20 25 30

<210> 40
<211> 33
<212> PRT
<213> *Strongylocentrotus purpuratus*

<400> 40
Gln Asn Ser Gln Val Gly Arg Ile Thr Ser Lys Ala Glu Ser Asn Glu
1 5 10 15
Gly Arg Ile Asn Ser Ala Asp Lys Arg Ala Lys Asn Ile Leu Arg Asn
20 25 30
Lys

<210> 41
<211> 31
<212> PRT
<213> *Caenorhabditis elegans*

<400> 41
Gln Asn Arg Gln Leu Asp Arg Ile His Asp Lys Gln Ser Asn Glu Val
1 5 10 15
Arg Val Glu Ser Ala Asn Lys Arg Ala Lys Asn Leu Ile Thr Lys
20 25 30

<210> 42
<211> 31

FOOOO"42024650

<213> Drosophila sp.

Gln Asn Arg Gln Ile Asp Arg Ile Asn Arg Lys Gly Glu Ser Asn Glu
1 5 10 15
Ala Arg Ile Ala Val Ala Asn Gln Arg Ala His Gln Leu Leu Lys
20 25 30

<213> Hirudinida sp.

Gln Asn Arg Gln Val Asp Arg Ile Asn Asn Lys Met Thr Ser Asn Gln
1 5 10 15
Leu Arg Ile Ser Asp Ala Asn Lys Arg Ala Ser Lys Leu Leu Lys Glu
20 25 30

<213> Artificial Sequence

<223> synthetic peptide

Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Ala
1 5 10 15
Leu

<213> Artificial Sequence

<223> synthetic peptide

```
<221> MOD_RES
<222> 16
<223> Xaa=Nle
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Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Xaa
1 5 10 15
Leu

<210> 46
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 46
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Ala Met
1 5 10 15
Leu

<210> 47
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 47
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Ser Lys Met
1 5 10 15
Leu

<210> 48
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 14
<223> Xaa=Abu

<400> 48
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Xaa Lys Met
1 5 10 15
Leu

<210> 49

T08230"4202450

<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 13
<223> Xaa=Abu

<400> 49
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Xaa Thr Lys Met
1 5 10 15
Leu

<210> 50
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 50
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Ala Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 51
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 11
<223> Xaa=Abu

<400> 51
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Xaa Ala Thr Lys Met Leu
1 5 10 15

<210> 52
<211> 17
<212> PRT

T03230-4c02450

<400> 55

Ser Asn Lys Thr Arg Ile Asp Gln Ala Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 56

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 56

Ser Asn Lys Thr Arg Ile Asn Glu Ala Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 57

<211> 40

<212> PRT

<213> Homo sapiens

<400> 57

Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Ser Ser Ala Ala
20 25 30
Lys Leu Lys Arg Lys Tyr Trp Trp
35 40

<210> 58

<211> 40

<212> PRT

<213> Bos taurus

<400> 58

Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Thr Ser Ala Ala
20 25 30
Lys Leu Lys Arg Lys Tyr Trp Trp
35 40

<210> 59

<211> 40

Truncated

<212> PRT
<213> Rattus sp.

<400> 59

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Val	Phe	Glu	Ser	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35				40									

<210> 60
<211> 40
<212> PRT
<213> Rattus sp.

<400> 60

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35				40									

<210> 61
<211> 40
<212> PRT
<213> Rattus sp.

<400> 61

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35				40									

<210> 62
<211> 40
<212> PRT
<213> Rattus sp.

<400> 62

Asp	Leu	Val	Ala	Gln	Arg	Gly	Glu	Arg	Leu	Glu	Leu	Leu	Ile	Asp	Lys
1				5					10					15	
Thr	Glu	Asn	Leu	Val	Asp	Ser	Ser	Val	Thr	Phe	Lys	Thr	Thr	Ser	Arg
			20					25					30		
Asn	Leu	Ala	Arg	Ala	Met	Cys	Met								
		35				40									

FOUO "FOUO" FOUO

<400> 63
Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg Ala Asp Ala Leu
1 5 10 15
Gln Ala Gly Ala Ser Val Phe Glu Ser Ser Ala Ala Lys Leu Lys Arg
20 25 30

<400> 64
Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg Ala Asp Ala Leu
1 5 10 15
Gln Ala Gly Ala Ser Gln Phe Glu Thr Ser Ala Ala Lys Leu Lys Arg
20 25 30

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<400> 65
Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg
 1              5              10              15
Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Ser Ser Ala Ala
          20              25              30
Lys Leu Lys Arg Lys Tyr Trp Trp
      35              40

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```
<400> 66
Asp Lys Val Leu Asp Arg Asp Gly Ala Leu Ser Val Leu Asp Asp Arg
 1             5             10             15
Ala Asp Ala Leu Gln Gln Gly Ala Ser Gln Phe Glu Thr Asn Ala Gly
                20             25             30
Lys Leu Lys Arg Lys Tyr Trp Trp
      35             40
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<400> 67

<210> 68

<212> PRT

<400> 68

<210> 69

<211> 40

<212> PRT

<400> 69

<210> 70

<211> 40

<212> PRT

<400> 70

Glu Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Gly Glu Arg
1 5 10 15
Ala Asp Gln Leu Glu Gly Gly Ala Ser Gln Ser Glu Gln Gln Ala Gly
20 25 30
Lys Leu Lys Arg Lys Gln Trp Trp

35

40

<210> 71
<211> 40
<212> PRT
<213> *Drosophila* sp.

<400> 71
Glu Lys Val Leu Glu Arg Asp Ser Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Gln Gly Ala Ser Gln Phe Glu Gln Gln Ala Gly
20 25 30
Lys Leu Lys Arg Lys Phe Trp Leu
35 40

<210> 72
<211> 39
<212> PRT
<213> *Hirudinida* sp.

<400> 72
Asp Lys Val Leu Glu Lys Asp Gln Lys Leu Ala Glu Leu Asp Arg Ala
1 5 10 15
Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Ala Ser Ala Gly Lys
20 25 30
Leu Lys Arg Lys Phe Trp Trp
35

<210> 73
<211> 18
<212> PRT
<213> *Homo sapiens*

<400> 73
Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 74
<211> 18
<212> PRT
<213> *Bos taurus*

<400> 74
Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

TC22B0"4202450

<210> 75
<211> 18
<212> PRT
<213> Rattus sp.

<400> 75
Glu His Ala Lys Glu Glu Thr Lys Lys Ala Ile Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 76
<211> 18
<212> PRT
<213> Rattus sp.

<400> 76
Glu Lys Ala Arg Asp Glu Thr Arg Lys Ala Met Lys Tyr Gln Gly Gly
1 5 10 15
Ala Arg

<210> 77
<211> 18
<212> PRT
<213> Rattus sp.

<400> 77
Glu Arg Gly Gln Glu His Val Lys Ile Ala Leu Glu Asn Gln Lys Lys
1 5 10 15
Ala Arg

<210> 78
<211> 18
<212> PRT
<213> Gallus gallus

<400> 78
Val Pro Glu Val Phe Val Thr Lys Ser Ala Val Met Tyr Gln Cys Lys
1 5 10 15
Ser Arg

<210> 79
<211> 18
<212> PRT

FO3230"402450

<213> Strongylocentrotus purpuratus

<400> 79

Val Arg Arg Gln Asn Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 80

<211> 18

<212> PRT

<213> Aplysia sp.

<400> 80

Glu Thr Ala Lys Met Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 81

<211> 18

<212> PRT

<213> Teuthoida sp.

<400> 81

Glu Thr Ala Lys Val Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 82

<211> 18

<212> PRT

<213> Drosophila sp.

<400> 82

Gln Thr Ala Thr Gln Asp Thr Lys Lys Ala Leu Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 83

<211> 18

<212> PRT

<213> Hirudinida sp.

<400> 83

Glu Thr Ala Ala Ala Asp Thr Lys Lys Ala Met Lys Tyr Gln Ser Ala
1 5 10 15

TEBEO"4202450

Ala Arg

<210> 84
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic construct

<400> 84
 Gly Gly Gly Gly Ser
 1 5

<210> 85
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic construct

<221> MOD_RES
 <222> 1
 <223> Xaa=fluorescein-modified lysine

<221> MOD_RES
 <222> 20
 <223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
 <222> (0)...(0)
 <223> at the C-terminal

<400> 85
 Xaa Asp Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
 1 5 10 15
 Met Leu Xaa

<210> 86
 <211> 13
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic construct

<221> MOD_RES

TO3250-4202450

<222> 1

<223> Xaa=fluorescein-modified lysine

<400> 86

Xaa Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln
1 5 10

<210> 87

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic construct

<221> MOD_RES

<222> 7

<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION

<222> (0)...(0)

<223> at the C-terminal

<400> 87

Arg Ala Thr Lys Met Leu Xaa
1 5

<210> 88

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<221> MOD_RES

<222> 1

<223> Xaa=fluorescein-modified lysine

<221> MOD_RES

<222> 23

<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION

<222> (0)...(0)

<223> at the C-terminal

<400> 88

Xaa Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr
1 5 10 15
Lys Met Leu Gly Ser Gly Xaa

TO3230"4202450

20

<210> 89
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 21
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 89
Xaa Ala Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala
1 5 10 15
Thr Lys Met Leu Xaa
20

<210> 90
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 24
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 90
Xaa Ala Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala
1 5 10 15

FOUO-4202450

Thr Lys Met Leu Gly Ser Gly Xaa
20

<210> 91
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 16
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 91
Xaa Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Xaa
1 5 10 15

<210> 92
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 19
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 92
Xaa Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly
1 5 10 15
Ser Gly Xaa

TO3230-4202450

```
<210> 93
<211> 22
<212> PRT
<213> Artificial Sequence
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<220>
<223> synthetic peptide

```
<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine
```

```
<221> MOD_RES
<222> 22
<223> Xaa=tetramethylrhodamine-modified lysine
```

```
<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal
```

```
<400> 93
Xaa Met Glu Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
 1             5             10             15
Met Leu Gly Ser Gly Xaa
      20
```

```
<210> 94
<211> 16
<212> PRT
<213> Artificial Sequence
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<220>
<223> synthetic peptide

```
<221> MOD_RES
<222> 1
<223> Xaa-DABCYL modified lysine
```

```
<221> MOD_RES
<222> 16
<223> Xaa=EDANS modified glutamate
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```
<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal
```

<400> 94
Xaa Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Xaa

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<400> 96
Met Ser Ala Pro Ala Gln Pro Pro Ala Glu Gly Thr Glu Gly Thr Ala
 1          5          10          15
Pro Gly Gly Gly Pro Pro Gly Pro Pro Pro Asn Met Thr Ser Asn Arg
      20          25          30
Arg Leu Gln Gln Thr Gln Ala Gln Val Glu Glu Val Val Asp Ile Ile
      35          40          45
Arg Val Asn Val Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu
      50          55          60
Leu Asp Asp Arg Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu
65          70          75          80
Ser Ser Ala Ala Lys Leu Lys Arg Lys Tyr Trp Trp Lys Asn Cys Lys
      85          90          95
Met Met Ile Met Leu Gly Ala Ile Cys Ala Ile Ile Val Val Val Ile
      100          105          110
Val Ile Tyr Phe Phe Thr
      115

```